

A Christian Response to Under-Representation of Women in Engineering Degree Programs

Dr. Gayle E. Ermer
Calvin College

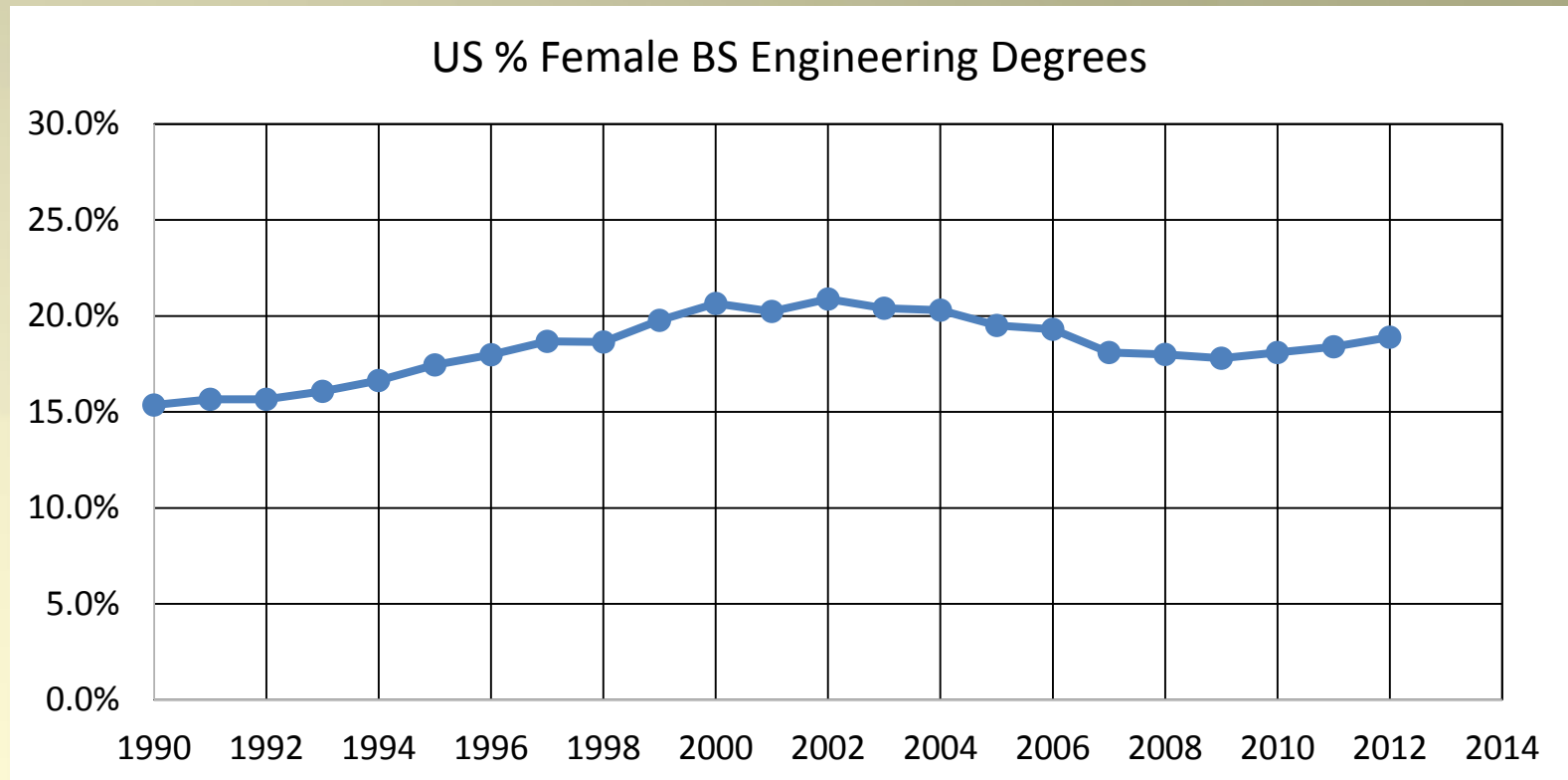


Outline

- Participation of women in engineering disciplines at various types of schools
- Retention of women engineering students at Calvin College
- Efforts to increase retention at Calvin College
- Best practices for increasing retention of women engineering students
- Overcoming barriers and why Christians should care

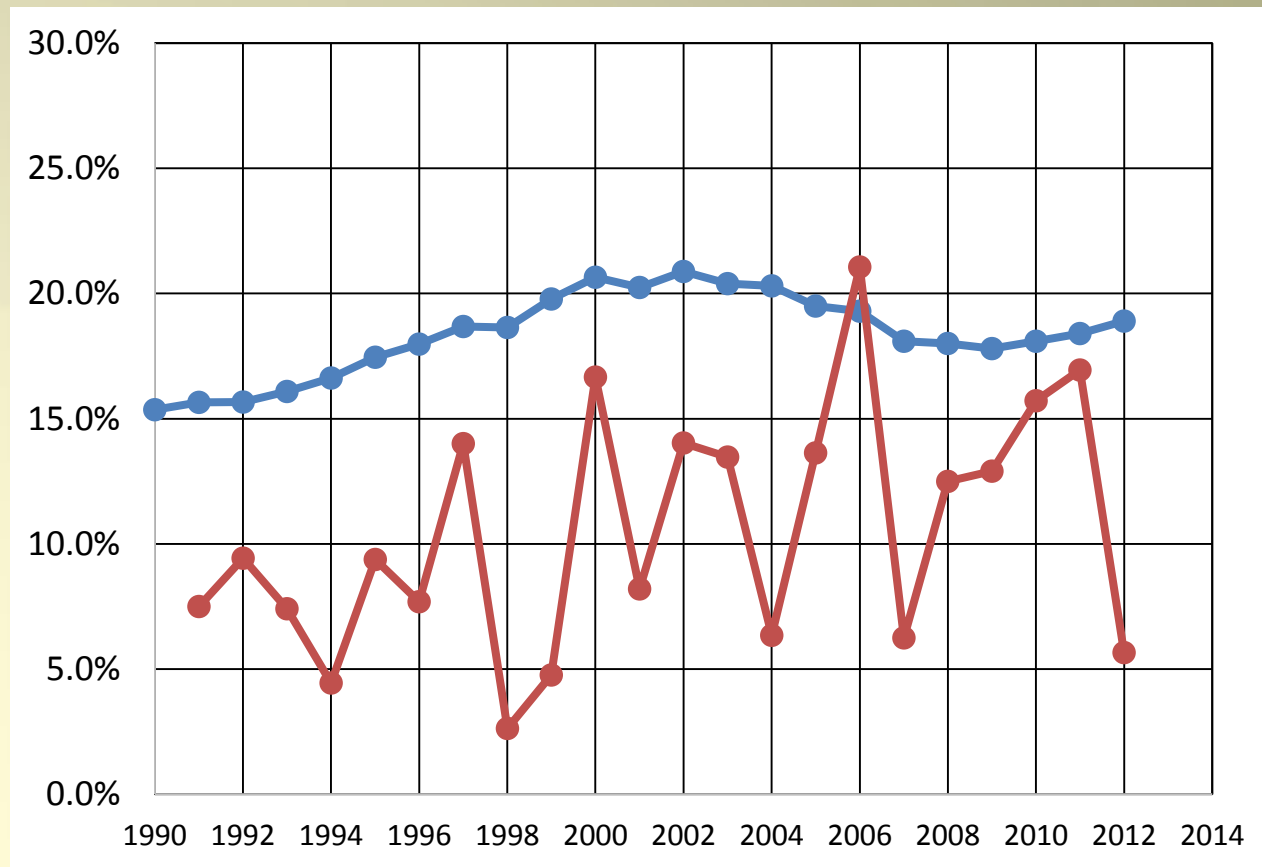


Participation of Women in Engineering Education (BS)



Participation of Women in Engineering Education

- U.S. vs Calvin College

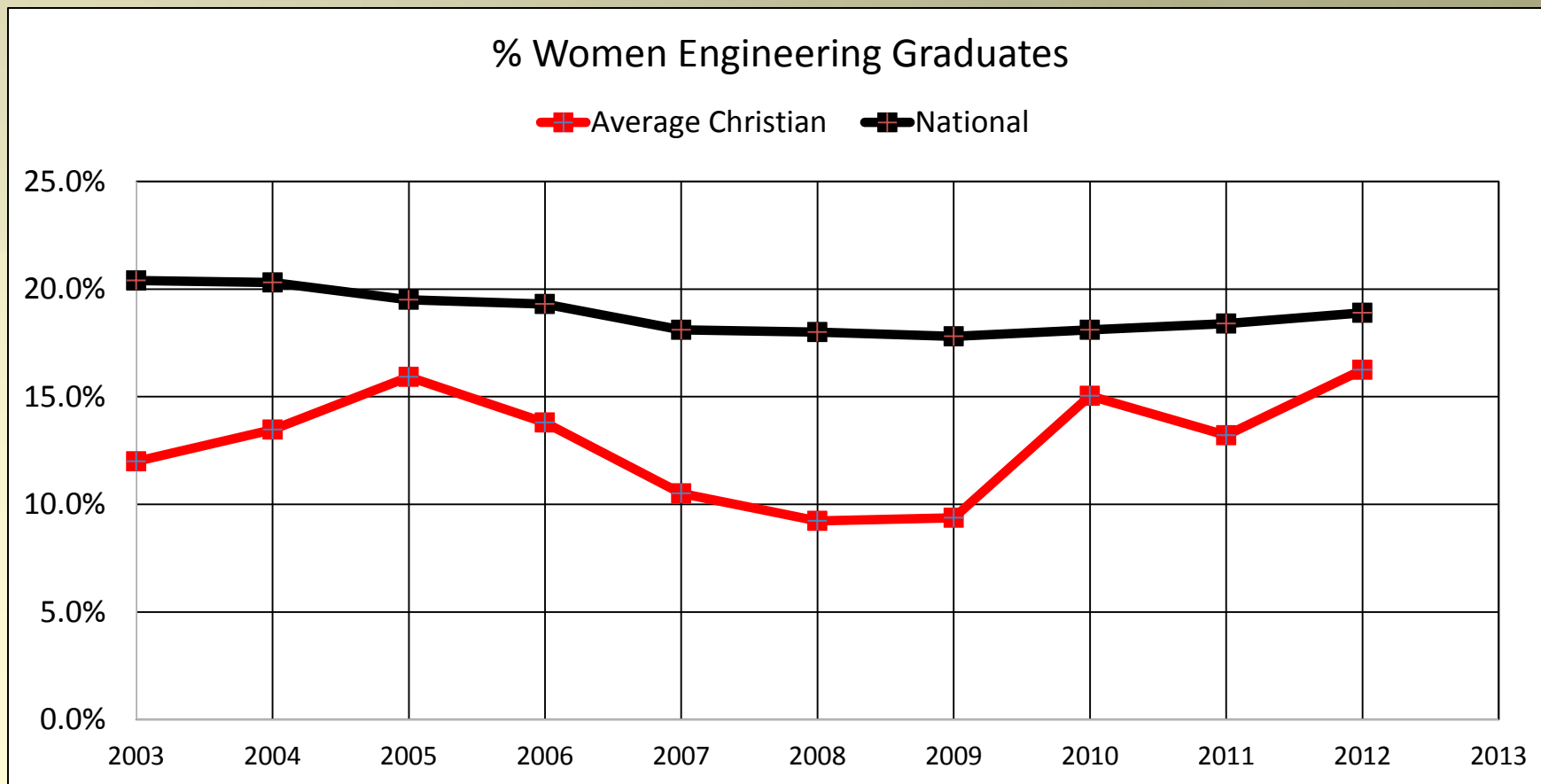


Where are the women engineering students?

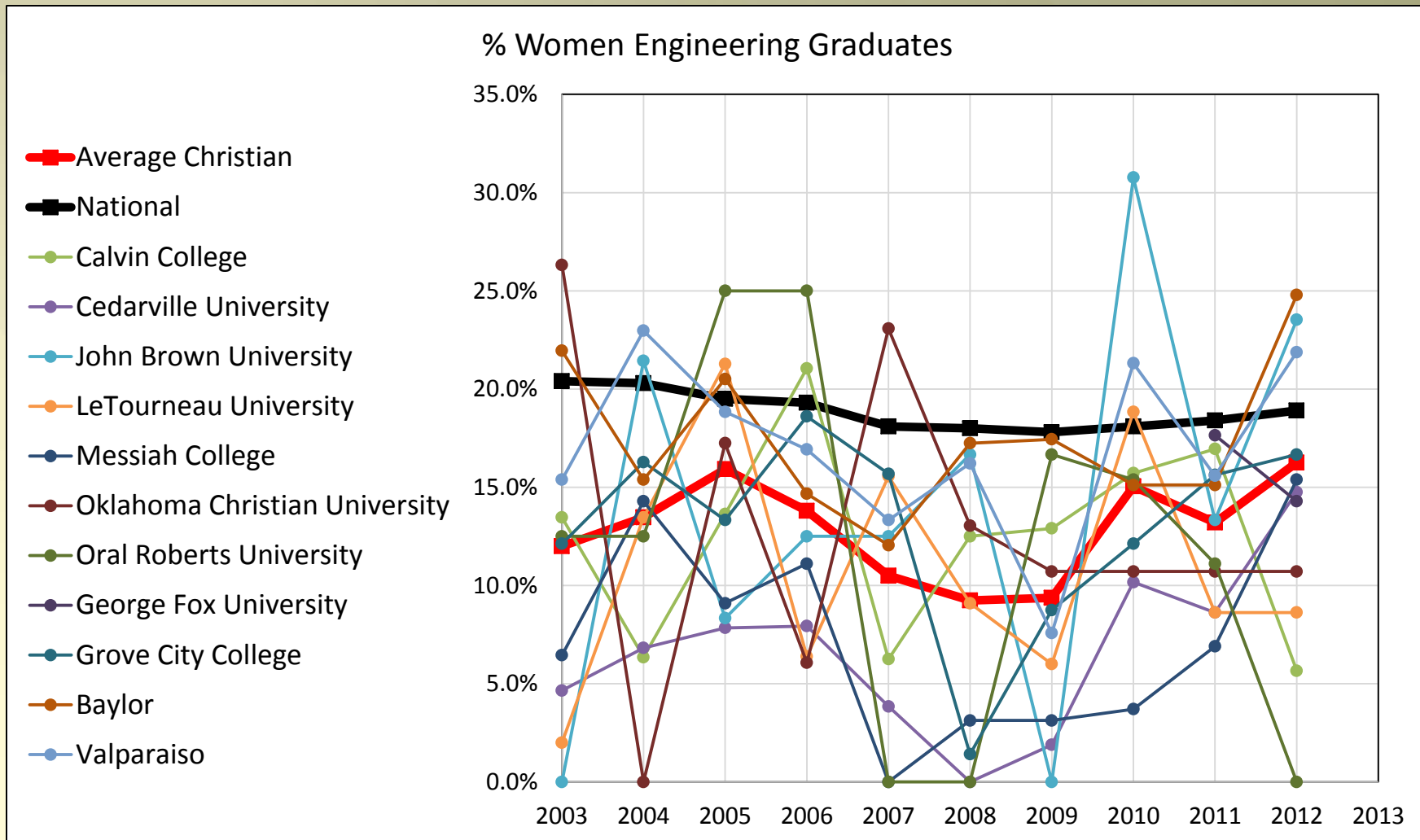


Participation of Women in Engineering Programs

- Christian Colleges

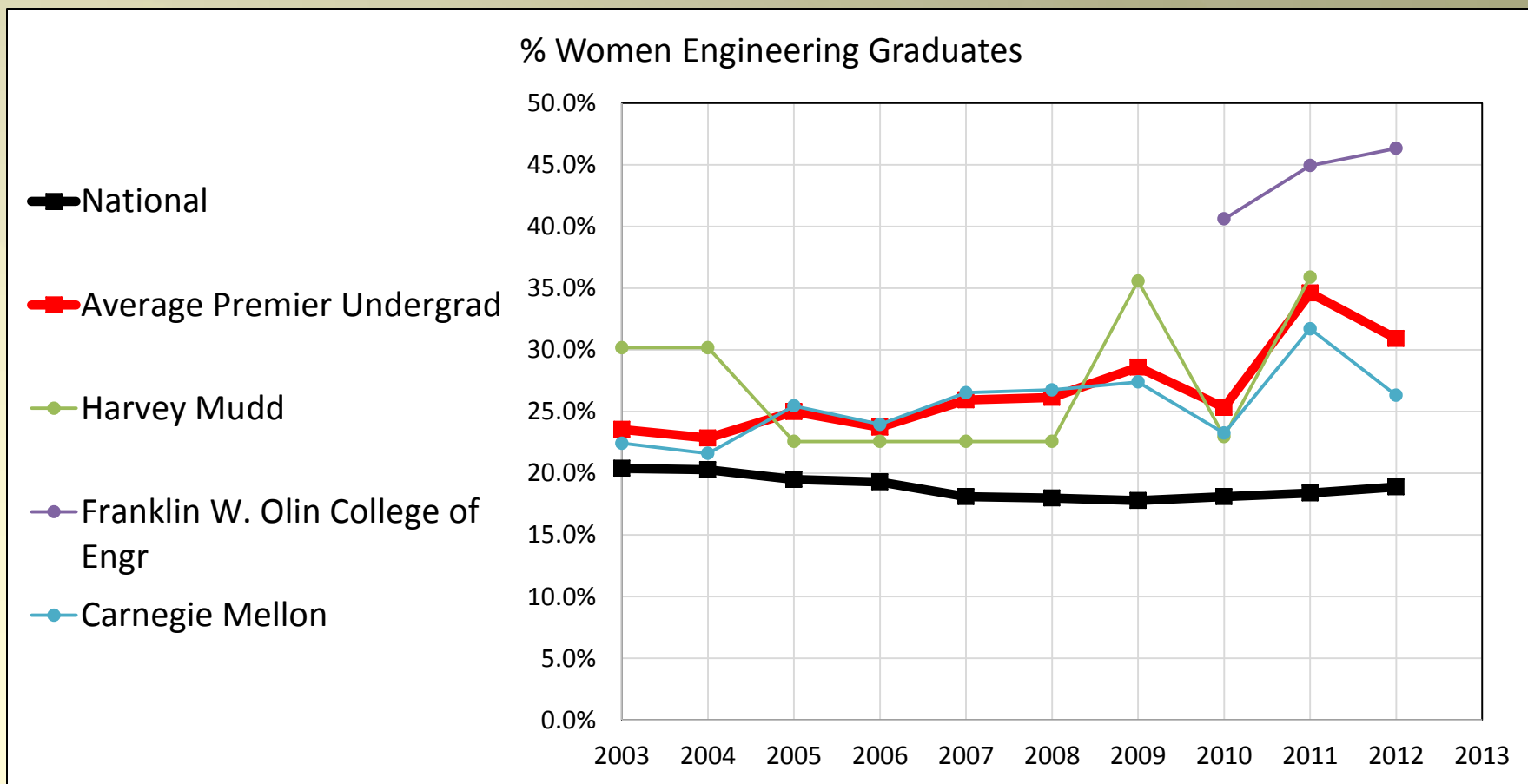


Participation of Women in Engineering Programs



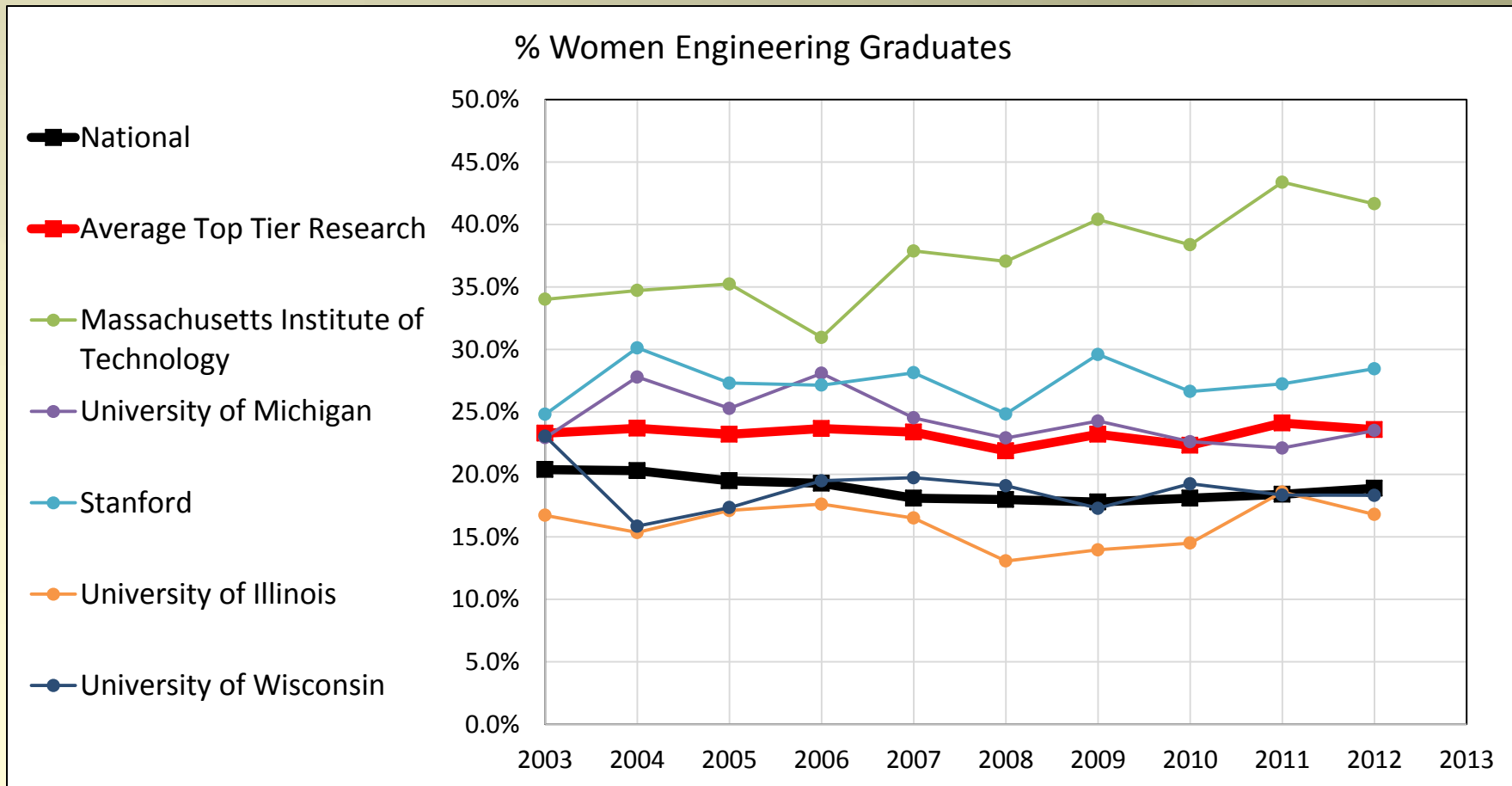
Participation of Women in Engineering Programs

- Premier Undergraduate



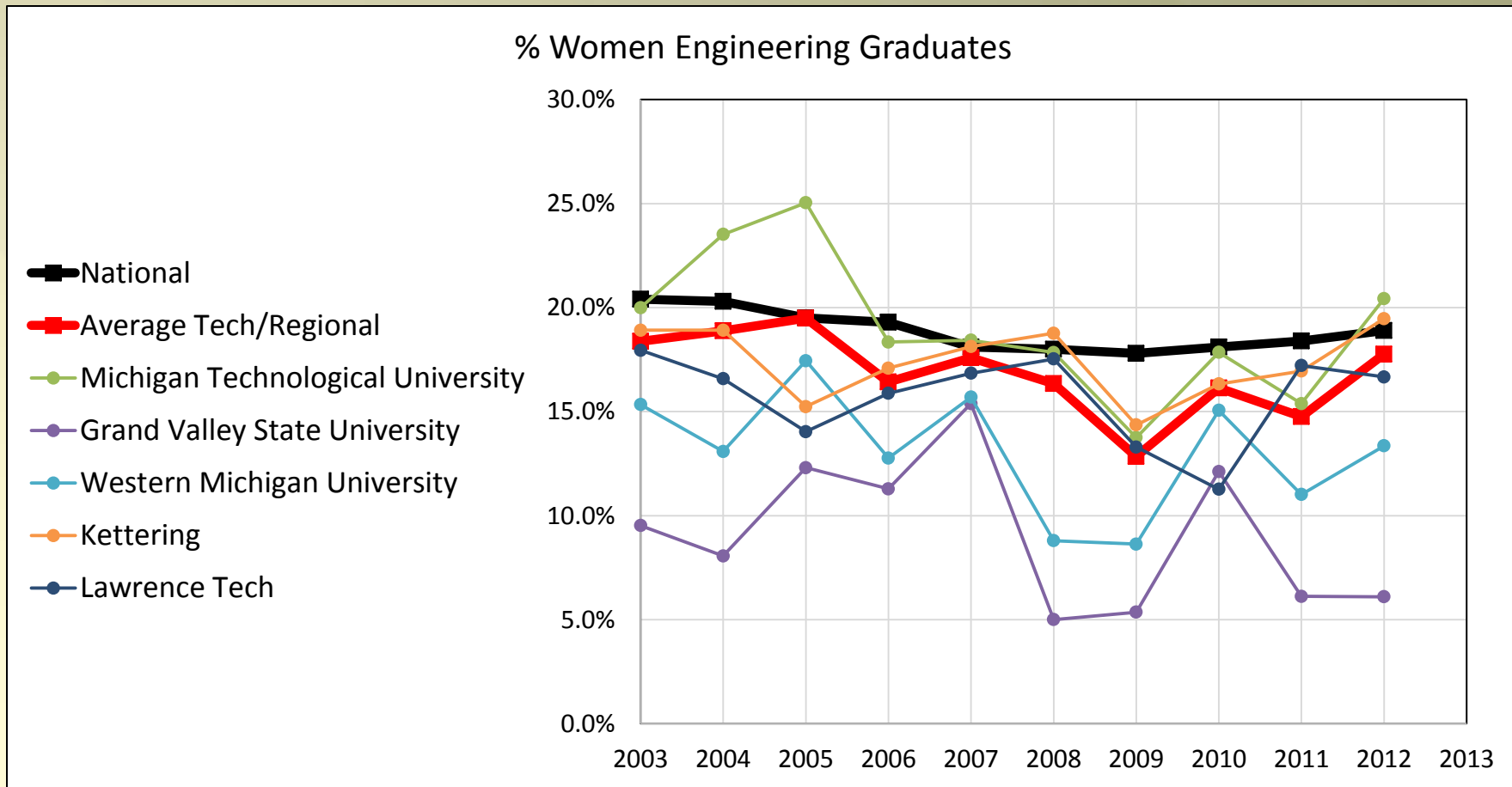
Participation of Women in Engineering Programs

- Large Research Universities



Participation of Women in Engineering Programs

- Regional and Technical Universities



Hypothesis #1

- Participation of women in engineering is higher at highly selective schools because women students who choose engineering are on average better students than the males who choose engineering
 - Problem: average men think they can be engineers, but average women do not



Engineering Student Characteristics at Calvin College

- Incoming class of fall 2009. Of those students still in engineering in the fall of 2010:
 - Avg GPA males = 3.25
 - Avg GPA females = 3.39
- Senior engineering students in fall 2012
 - Avg GPA males = 3.20
 - Avg GPZ females = 3.49



Hypothesis #2

- Participation of women in engineering is lower at institutions where the atmosphere and curriculum are traditionally more “technical”
 - Problem: men are attracted to technology, while women are less attracted to the hands-on, practical, competitive aspects of technology (perhaps because they have not been immersed early in their lives)

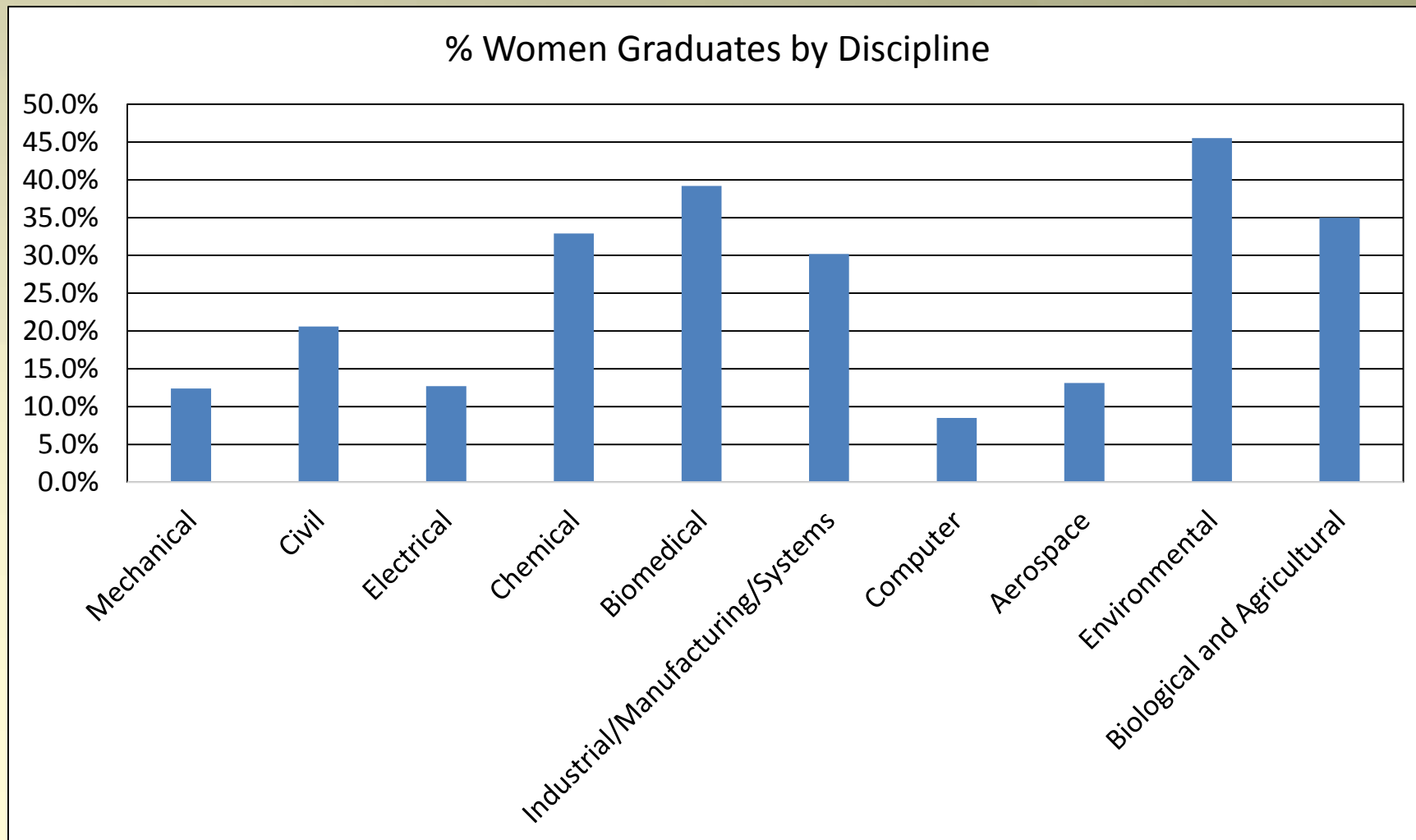


Hypothesis #3

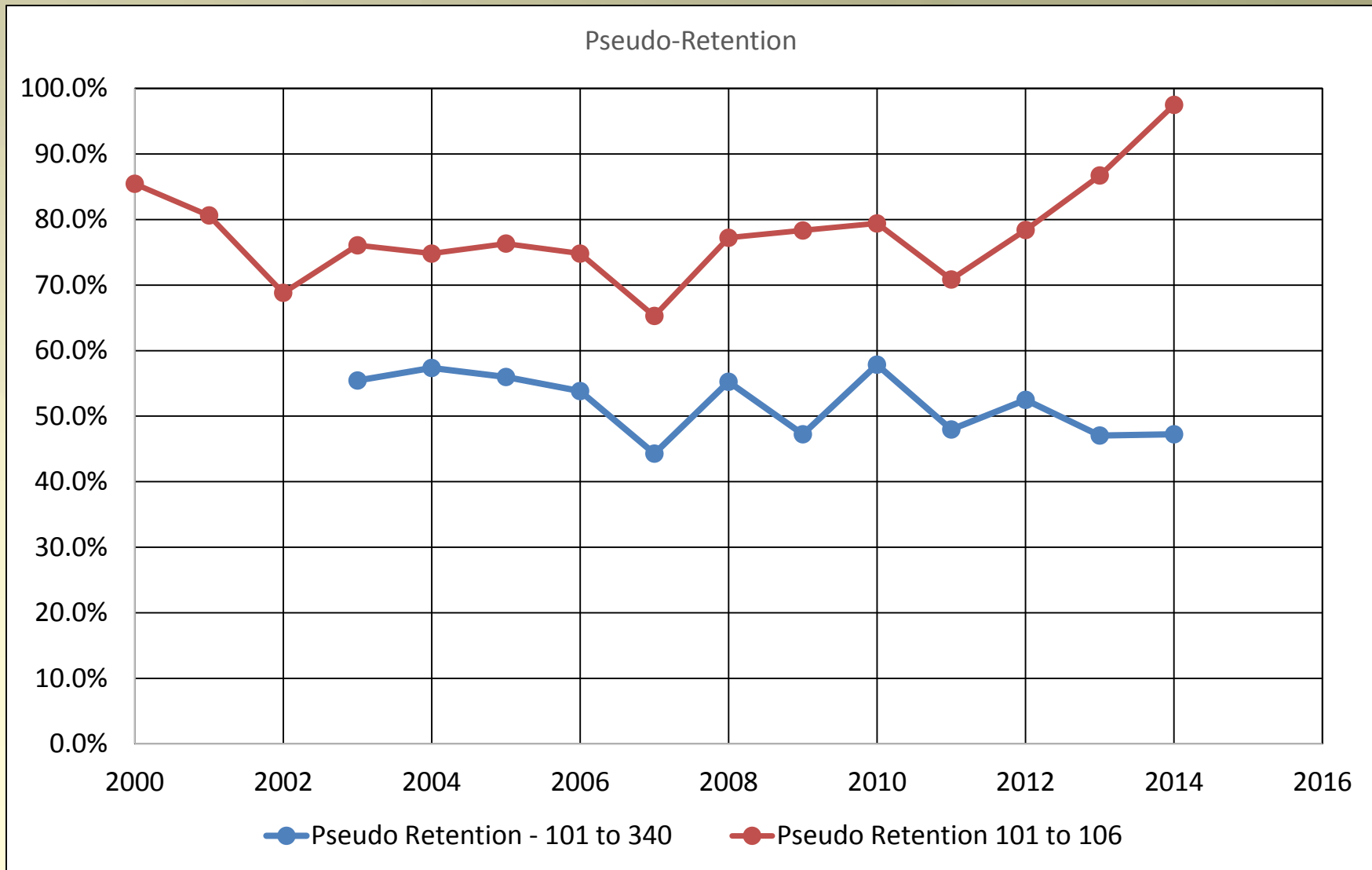
- Participation of women in engineering at Christian colleges is low because many come from conservative families and religious traditions that do not fully encourage “professional” career aspirations for women
 - Problem: men choose a career assuming they will need to support of family whereas women choose a career anticipating the need to balance work and family



Participation of Women in Engineering Programs

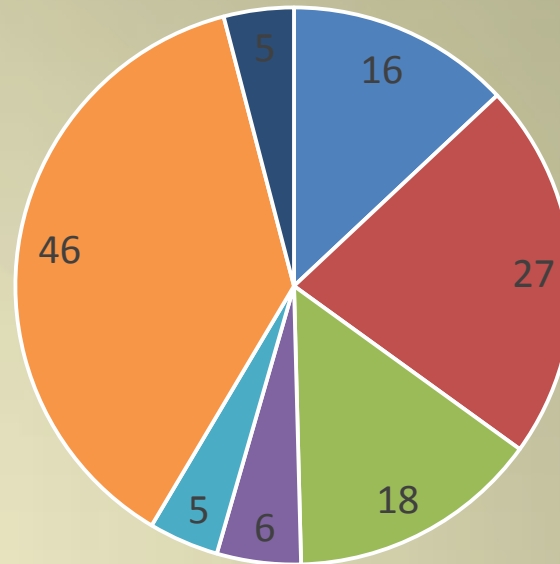


Pseudo-Retention at Calvin College



Retention at Calvin College

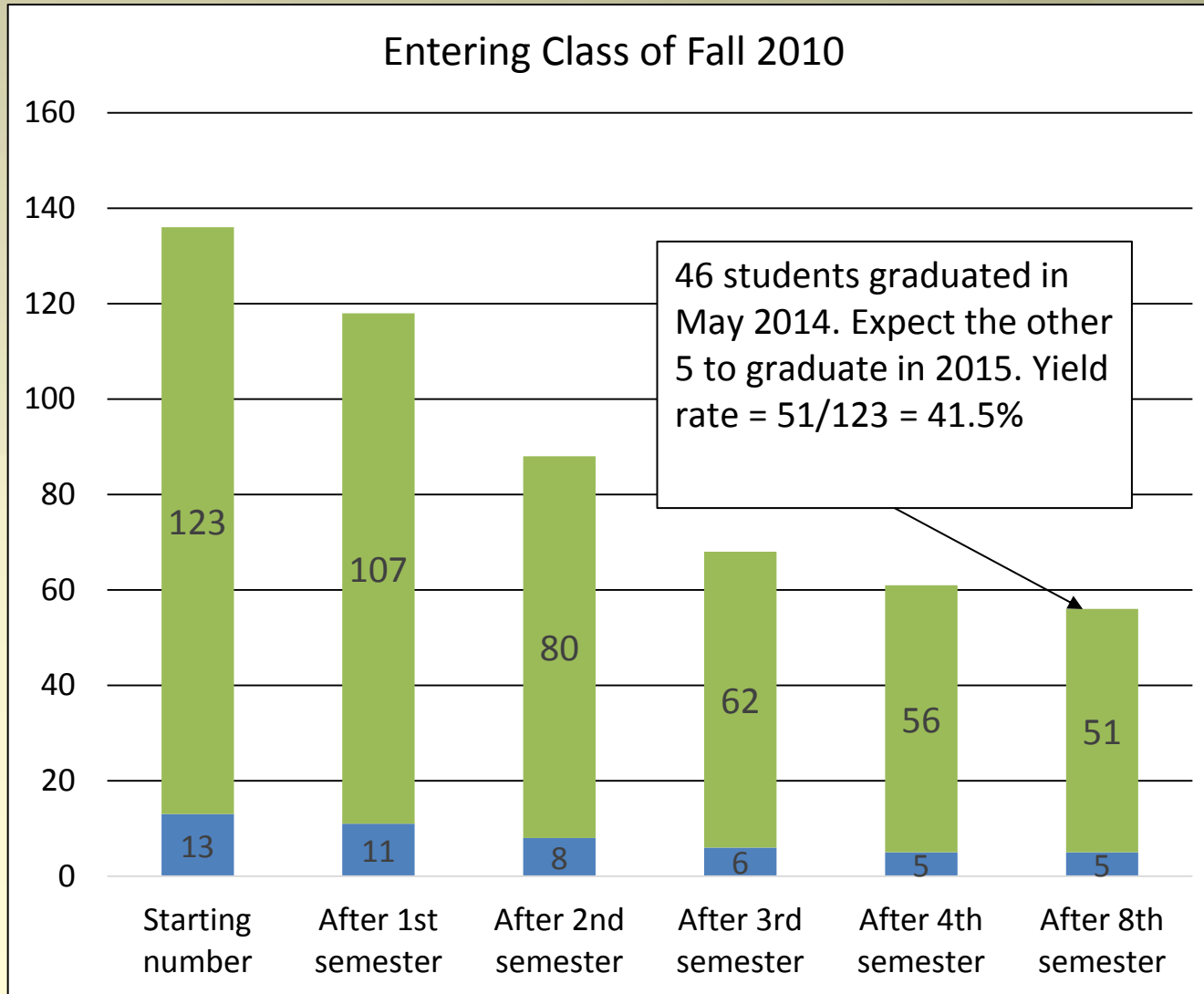
Entering Class of Fall 2010



- Left after 1st Semester
- Left after 2nd Semester
- Left after 3rd Semester
- Left after 4th Semester
- Left in last 4 Semesters
- 2014 Graduates
- Remaining to Graduate in 2015



Retention at Calvin College



Women yield rate = $5/13 = 38.5\%$



Efforts to Increase Female Retention at Calvin College

- Women Engineers dorm floor (opt in)
- Women Engineers study room and teaching assistant
- Women Engineers social gatherings
- ENGR 101 – selling engineering as a service profession



Best Practices for Increasing Engineering Student Retention

- K-12 outreach
- Overcoming stereotypes in the media
- Focus on service and vocation
- Fostering self-efficacy
 - Team roles
 - Spatial visualization



Why Should Christians Care?

- Diversity in engineering = vocational service
 - All genders using God-Given gifts and skills
- Diversity in engineering = justice in opportunities
 - Removing barriers that prevent participation
- Diversity in engineering = better engineering solutions
 - Sufficient Engineering



Questions?

